

The BMT 931 Gets

**BMT'S 1/10
IC RACER
REVISITED**

'ACTIVATED'!

The first example of the BMT 931 that RRC looked at, way back in the September '93 issue, initiated your reviewer to 1/10 IC (gas) racing after 13 years of racing electric cars. The 931 soon endeared itself to me (and quite a few others) by proving to be as strong as the proverbial brick 'you-know what', and easy to set-up and drive. In fact, contrary to what I had read and heard about the BMT suspension system, the car wasn't hard to set up, and just a little twiddling with the geometry set the car up quite adequately to suit most circuits without changing the shock oil.

Enter The 1/8 Scale 'Active'...

The advent of the 931's 4wd 'Active' 1/8 scale big brother in 1994 instilled the thought in many people's minds that the 'Active' rear suspension design might well be ideal for the 1/10 scale, 2wd 931. Steve Whiting, the first driver to take the 931 into the limelight in this country, was the first to incorporate the new suspension into the 931, and since then his car has been very impressive indeed. In the light of Steve's success, quite a few 931 owners have updated their cars to 'Active' spec, with the overall impression being that the

rear end mods make what was already a very stable car even more sure-footed, and even easier to drive.

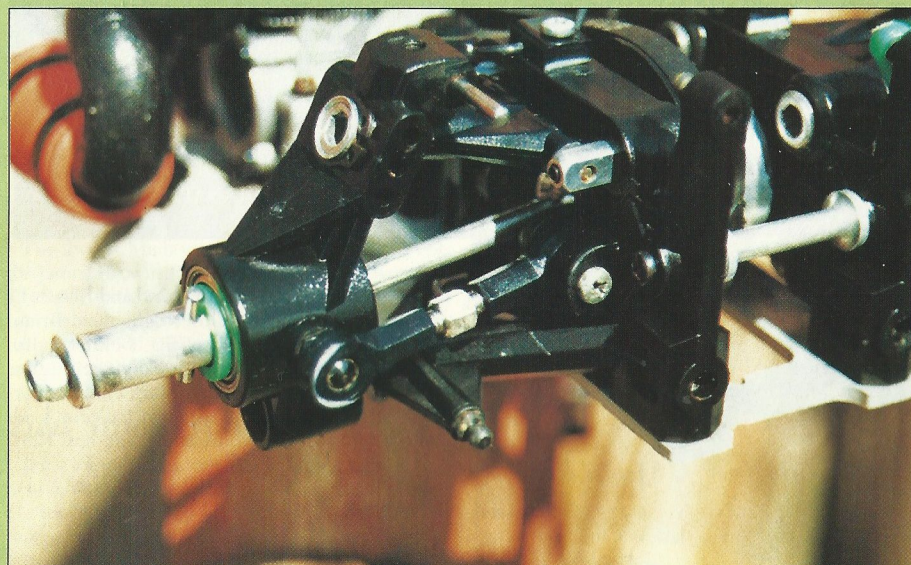
A Little Bit Of This, And A Little Bit Of That...

Blitz Model Technica don't actually market a 1/10 scale 931 'Active' kit, although they do produce a 1/8 scale 2wd version sold in mainland Europe where 2wd 1/8 racing is very much alive and well. So, how can the eager 1/10 IC driver build a car such as the one seen here?

The answer lies with BMT's English importer, John Dyett of Hayley Green Models. John can kit (!) either existing or prospective 931 drivers out with the parts required to bring the 931 up to the very latest 'Active' spec (slightly different to that seen here), the necessary goodies being listed here:

- 2 x Packs wishbones #845
- 2 x Packs alloy wishbone hangers #882
- 1 x Pack tie-rods #910
- 1 x Pack tie-rod retainers #911
- 1 x Pack plastic ball ends #853
- 2 x Packs upper ball joint retainers #862
- 1 x Pack metal ball joints #460
- The quoted retail price for the parts listed here is £64.18 inc. vat

The heart of the matter - the 'Active' geometry linkage. The turnbuckle allows easy adjustment to the required settings.



The quoted retail price from Hayley Green for a 'fully loaded' BMT 931 Active built to this specification is £339, minus the NovaRossi CX15 engine, pipe and manifold. Expensive? Not at all really considering its quality and that if it was a top level electric car (of whatever manufacture) it would then need kitting out with an electronic speed controller costing up to £150, batteries costing up to £50 per pack (multiples of), and for motive power a choice of several motors retailing at up to £50 each. The BMT package then begins to appear very attractive indeed, especially when it's taken into consideration that the 2 speed gearbox and ball differential are supplied ready built!

Want to know more? Well, as I said earlier, the BMT 931 has been reviewed in RRC before, but this development 'Actively' suggests that another look at BMT's little road rocket is required!

The Front End

I think I'm right in saying that the original BMT 1/8 car pioneered the use of an angled top wishbone to give a reduction in the castor angle during compression. This change to the geometry gives both stability on the straights and an aggressive steering response when it's needed. The 931 was the first 1/10 IC car on the market to use this type of suspension design, with the very similar Picco car following its lead. Interestingly, BMT's very latest Active 95R 1/8 4wd car has reverted to a horizontal upper wishbone, but personally I'm convinced that the 931's use of the angled, castor reducing design contributes to the car's excellent handling and



turn-in to corners, useful on some of the tight tracks we race on in Britain.

The chunky nylon hubs pivot upon large diameter hex headed balljoints at top and bottom, allowing both the camber and track width to be easily adjusted with an allen key without removing the wheels, with the 6mm diameter live axles housed in substantial 13 mm diameter bearings. As for castor adjustment, this easily done by loosening the grub screw in the upper pivot pin housing and moving the upper arm to the desired position.

The Chassis

Very few changes have been made by BMT to the 2.5mm alloy chassis plate used for the previous review car. As the 931 is now also available as a 4wd car in the Far East and Japan, the present 2wd kits have 4 countersunk holes between the front suspension mountings to accept the 4wd transmission, whilst at the rear, the plate is no longer slotted beneath the lower suspension arm pivots. This has cured the earlier problem of the chassis sometimes twisting sideways along its length in a heavy crash.

The 2mm alloy radio plate has been totally redesigned, and now caters both for the now universal slide carburettor engines used in 1/10 IC racing, and the optional 4wd system. The well proven BMT 75cc tank is situated further to the right hand side to clear the front drive belt, with

BMT now supply 'screw on' pinion gears, so ratio changes are easy.

little trouble when actually putting the car together.

The characteristics of the diff can be altered by either loosening or tightening the clamping ring using a cap head screw. This doesn't alter the all-important pre-load, while the action can be either ultra-free or quite tight, so the diff is particularly pleasant to use. The 'pawl' type gearbox is simplicity itself to

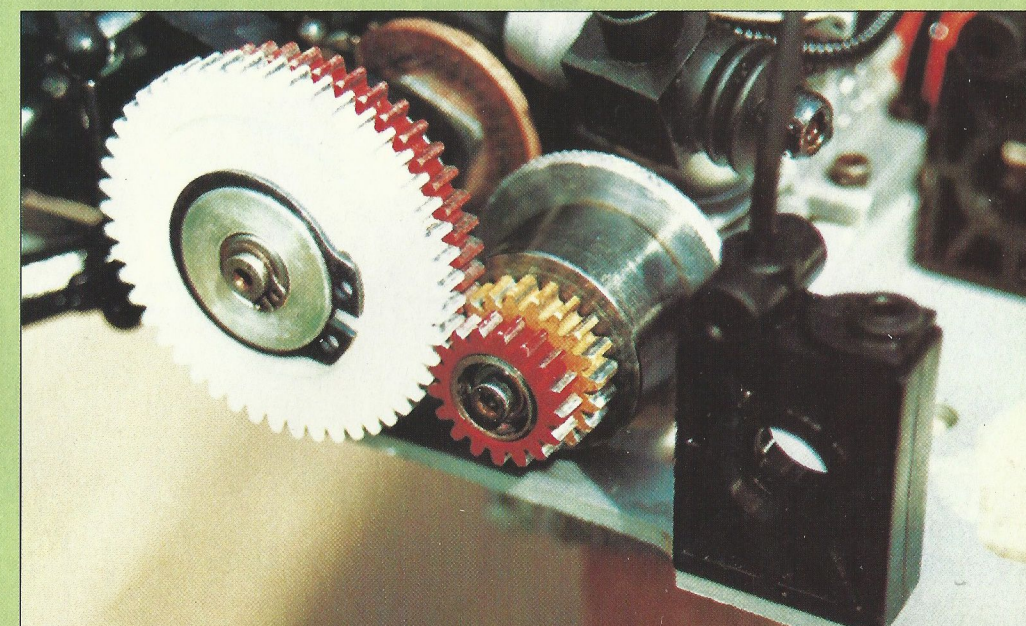
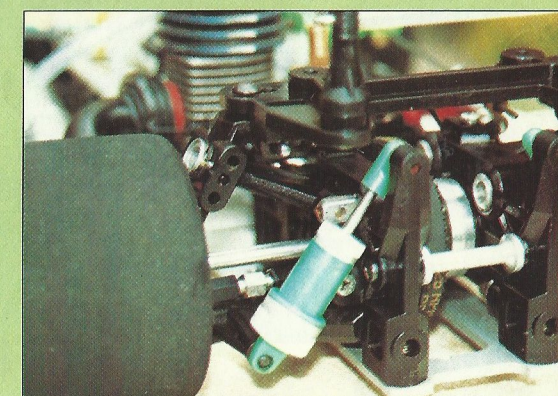
the plastic receiver and battery pack mounting plates positioned in literally the only space left available!

I changed the positioning of the receiver and batteries from that suggested. To counterbalance the weight of the engine and tuned pipe assembly, I rebuilt the cells in two layers of 3 and 2 cells, then heatshrunk them to the Rx mounting plate on the right side, just behind the front wheels, with the Rx finding a home on the battery plate, enclosed in a Medial Pro rubber cover from Puma Racing. This not only balanced the car perfectly along its centreline, but also shifted the C of G forward a little, placing more weight on the front wheels (I do like steering y'know!).

The Transmission

Sourced as it is from a 1/8 car, this is basically bulletproof! The 2-speed 'pawl and pin' gearbox and adjustable differential are supplied pre-assembled, so even a total novice should have

The short 'Active' rear upper wishbone increases the camber change over the standard version, improving stability under hard cornering.



The 931's castor reducing front end works very well. Slackening the grub screw in the pivot housing allows adjustment of the 'static' castor angle.

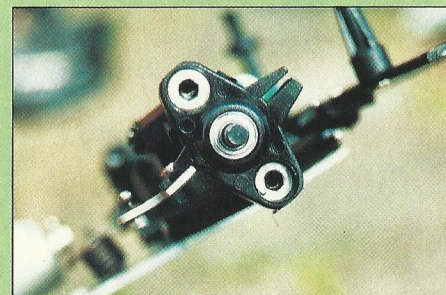
set with its single screw adjustment, being basically a 'fit and forget' item. The 6mm layshaft ensures that even a heavy prang doesn't result in the gears wobbling around on the end of a bent shaft. Just the job for newcomers to the 'gas' racing scene!

The 'Active' Bit (At Last!)

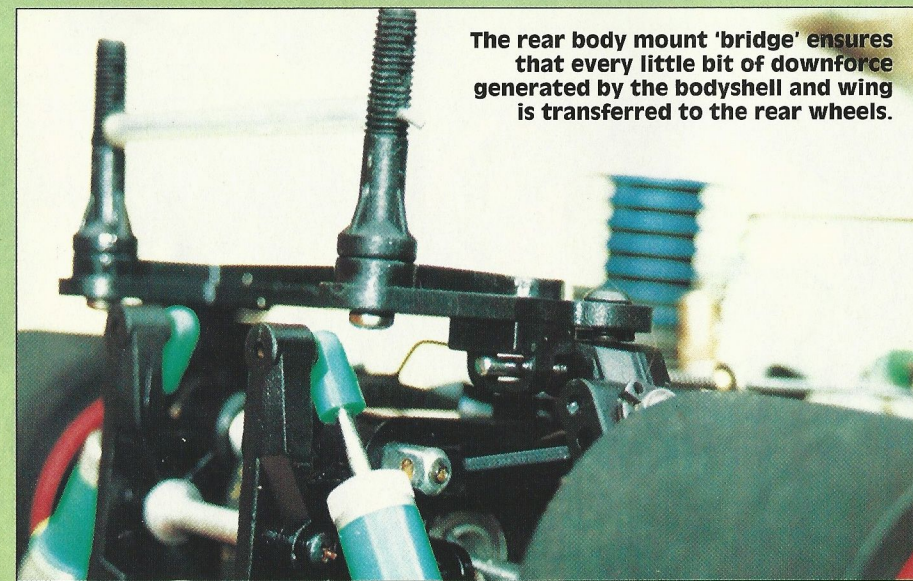
Now for the interesting bit, the rear suspension. As luck would have it, the very latest '95 spec 'Active' rear end is slightly different from that seen here, having changed since the kit was delivered to RRC (such is the pace of development!), but not to such an extent that its effect is really any different.

The basic principle of the 'Active' link system is that any depression of the rear suspension results in the rear wheels adopting more toe-in than the amount set at normal ride height. This means that the rear end is very stable on a bumpy track

The captive balljoints allow adjustment to the track width and camber by inserting an allen key through the alloy retainers. Note the use of 6mm live axles running in substantial bearings.



The rear body mount 'bridge' ensures that every little bit of downforce generated by the bodyshell and wing is transferred to the rear wheels.



pin holes), with the link rod picking up on a balljoint at the rear of the outer hub. The new, shorter top wishbone gives a greater degree of camber change than the conventional design when the suspension loads up, so 'tramping' or grip rolling is now a thing of the past with the BMT, as the edges of the tyres no longer 'dig in'.

and when accelerating out of corners, because when the rear of the car 'squats' when the power is applied,

the wheels adopt an attitude of toe-in to give a stable, slingshot launch.

The 'Active' system actually gives the driver the best of both worlds, because it can be set to give very good turn-in to corners by setting it with the wheels parallel at normal ride height, then, when the nose of the car dips, such as when turning in and braking, the geometry will change to a slight amount of toe-out, therefore reducing under-steer. However, when the chassis squats, the parallel setting will change to slight toe-in, making for safe acceleration.

The 'Active' system is based around a balljointed linkage between the inner upright and the outer hub. The new short upper wishbone now pivots from a pin mounted in two alloy hangers that project through the inner upright from the standard 931's suspension pick up points. The alloy hangers are retained by screw-in alloy inserts. The outer hub pivots via balljoints at top and bottom (a hole needs to be drilled through the hub's flat portion, in line with the middle of the three conventional pivot

Race Testing, Plus A Few Tips!

If a magazine concerns racing cars, a proper review should include at least a driving, or even a full race test! Some magazines don't bother (in which case what's the point?), but RRC certainly does! To keep the record straight, the 931 was fitted with a Futaba PCM 40mhz receiver, KO PROPO 1004 FET servos on throttle and steering (awesome!), and a 5 cell, 500A/hr battery pack. The engine was a Nova Rossi CX15, as driven for over 12 months now, equipped with a PB Racing large bore manifold and, just for a change, a Mondial tuned pipe! A RaceCraft BMW was the chosen shell, which looks quite smart decorated with RaceCraft's K'ARCHER stickers.

I must first own up to having got the initial set-up totally wrong, having used much too heavy shock oil, but even so, the first time out the car set fastest lap of the day against very good opposition, qualifying 2nd, but a bad choice of rubber for the damp Final gave a low placing.

The next meeting was the first BRCA Regional of the season at Aldershot. Where better to glean a few set-up tips from Steve Whiting, the lap record holder with his example...

- **SHOCKS**
Front - 2 hole pistons 20 (or 30 for stability) weight oil
Rear - 2 hole pistons 20 weight oil
- **RIDE HEIGHT**
Front - 4mm
Rear - 6mm
- **TYRES**
Front - Ellegi 40°
Rear - Ellegi 30°
- **TOE-IN**
Front - Parallel or 1°
Rear - 1° at ride height/4° at full depression
- **CAMBER ANGLES**
Front - 2° negative
Rear - 1° negative (at ride height)

- **CASTOR**
Wishbone pushed right forward
- **ROLL-BAR UPLIFT ADJUSTING SCREW**
Set to allow no more than 1mm of suspension droop

Aldershot's meeting showed that the engine was well past its best by only keeping running for just the one Heat, the last, with only something like 4 laps on the board until then. Panic! The car was set-up for the Finals as per the tips seen here, and instantly handled better, so 2nd in both the B and the Clubman's Finals wasn't bad. Considering the engine was very tired (understatement of the year!), the lap times were very good, and promised more to come.

Southampton's National meeting saw a newly rebuilt engine, but no computer (!), so the Halifax Regional was the first race at which the car could be given some real stick!

The car was initially run using the described set-up, then I tried it with the shocks swapped around, so I had 30 wt oil on the back and 20wt on the front. Bingo! The handling was super safe using 35° fronts and 30° rears, so we eventually qualified 4th overall, then went on to take 2nd in the 20 minute A Final to Gavin 'The Beast' Reast. That's what you call a 'Full Race' test!

Supa Hints!

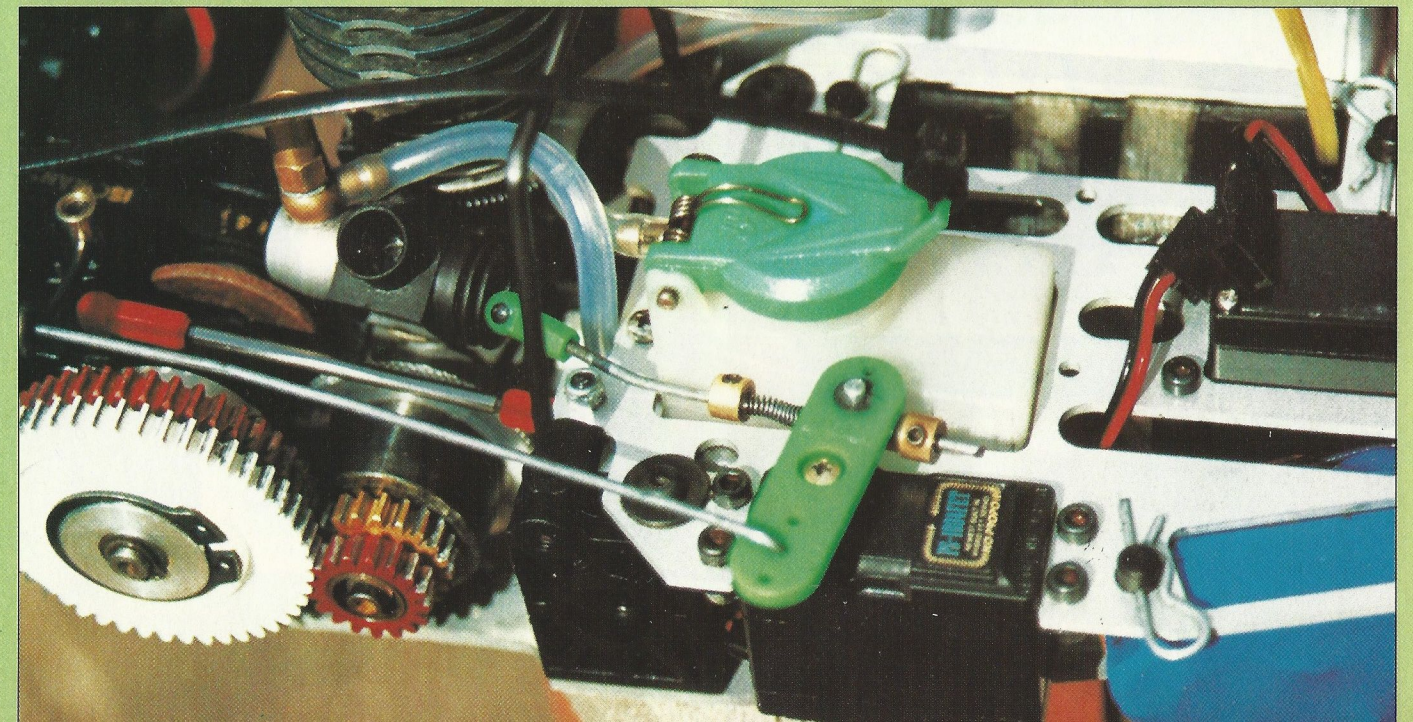
When assembling the front suspension, screw the plastic mouldings to the chassis, then insert a drill bit of the same diameter as the pivot pins through the holes. Switch on the drill and 'ream' out the holes - this will give a super free movement.

It's also a good idea to remove a little material from the underside of the lower front wishbones (just enough to clear the chassis). This small measure takes seconds, but improves the suspension's operation by a large degree (would the factory take note of this please?).

The gearbox is pre-assembled with the adjusting screw thread locked in place. I don't know what type of thread lock it is, but it can be very hard to turn the screw to alter the change point!

If it is tight, I suggest 'cooking' the thread lock out by taking the gearbox apart, then heating the alloy housing with a hot air gun until the locking compound loosens up.

The new radio plate situates the tank to the right of centre to clear the belt used in the 4wd version, so space is at a premium. The chassis brace can be seen here above the clutch bell, and the twin layer battery pack, actually mounted in the position intended for the receiver.



At normal ride height, the rear end can be seen here exhibiting no toe-in at all...

Lasting Impressions...

The instructions do leave a little to be desired in one or two areas, hence the set-up tips in this review, but otherwise the 931 is very easy and quick to build, with the alloy and moulded nylon parts of very high quality.

The kit's conventional 'shoe' clutch works well, but I gather that BMT's new high-tech design will soon be available to give greater 'punch' out of tight corners.

As for the car's track manners, they really are very good indeed. The 'Active' rear suspension makes the car so stable and 'driver friendly' that a novice could handle it without too many worries, whilst the 931's performance in the hands of an expert is already well proven.

Looked at in another light, the review 931 has so far taken part in four meetings, had two head-on crashes at 40 mph plus into cars that were stationary on the straight (!) and several Indy car type crashes that went on and on, yet to date nothing has broken. This is one very strong car...

If you've been considering taking up 1/10 IC circuit racing, the 'Active' modified BMT 931 is well worth your consideration.



... but pressing down on the chassis, as if it were squatting under power or cornering, brings the 'Active' geometry into play, hence the toe-in seen here. Clever!

BMT cars and accessories are available from John Dyett at Hayley Green Models, Hayley Green, Warfield, Bracknell, Berkshire. RG12 6BS. Tel (01344) 890091.